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# Conservation Systems Research

## *Optimum Nitrogen Rate for Dryland Corn in a Mature Conservation Tillage System*

### RESEARCH PROJECT DESCRIPTION NO. 52



Corn growing in winter cover crop residue. Will increased soil water storage promote greater yields and demand for more nitrogen?

### Researchers

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### The Challenge

Current nitrogen recommendations for dryland corn in Alabama are based on conventional tillage systems, in which the surface soil is tilled and left bare for substantial periods of time. Today, more and more Alabama growers are adopting conservation tillage systems, where either no or minimal tillage of the surface soil occurs, and winter cover crops are grown to protect the soil and increase organic matter contents.

In Alabama, corn grown in conservation tillage systems has potentially greater yields because of increased soil moisture storage from greater organic matter contents and mulching. Because of this greater yield potential, current nitrogen recommendations may not be adequate for corn in conservation tillage systems. This study will determine if higher nitrogen rates should be recommended for corn grown in mature conservation tillage systems.

## The Experiment

In the autumn of 2004, experiments were established at the Alabama Agricultural Experiment Station's Tennessee Valley Experiment Station (Belle Mina) and E.V. Smith Research and Extension Center (Shorter) to:

1. Determine the optimal nitrogen rate for dryland corn production for a mature conservation tillage system, and
2. Compare that rate with the optimal nitrogen rate for dryland corn in a conventional tillage system.

At both sites, the experiment will include two tillage treatments, several nitrogen rates, and four replications:

### Tillage treatments (both sites):

- Conservation tillage: non-inversion, deep tillage under the row, prior to planting.
- Conventional tillage: disk, chisel plow, and field cultivation.

### Nitrogen sidedress treatments:

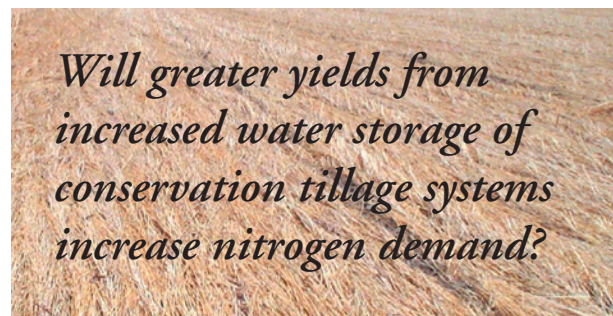
- Tennessee Valley: 80, 120, 160, and 200 lb N/acre.
- E.V. Smith: 40, 80, 120, 160, 200, and 240 lb N/acre.

All experimental plots will receive 40 lb N/acre at corn planting. A cereal rye cover crop will be established each autumn in all conservation tillage plots, beginning in 2004, and fertilized for maximum growth. Each spring, the cover crop will be rolled if growth warrants.

Prior to terminating the rye cover crop each spring, the carbon, nitrogen, and dry matter content will be determined for each plot.

Soil organic matter and inorganic nitrogen content will be monitored by collecting soil samples from each plot (to 90 cm depth) after corn harvest. Depth increments will be 0-15, 15-30, 30-45, 45-60, and 60-90 cm.

Corn populations and plant height one week after sidedress will be determined for each plot. Corn plant samples will also be analyzed for nitrogen and chlorophyll content at silking. At corn harvest, yield, test weight, and grain nitrogen content for each plot will be measured.



This project is supported by the Alabama Farmers Federation Wheat and Feed Grain Committee.